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ABSTRACT

In 1998, California voters approved Proposition 10, the Children and Families First Act, which placed an additional tax on cigarette sales; monies generated will be used to improve early childhood development for birth to five. In terms of early childhood development, the starting point is not birth but long before; care of women of reproductive age prior to conception and prenatal care are the cornerstone to a healthy start for children. This report makes the case for Proposition 10 investment in preconceptional and prenatal care. Following a brief introduction, the report defines preconceptional and prenatal care and reviews the literature on the impact of such care on early childhood development, noting that care can avert major maternal and infant morbidity and mortality, as well as promote healthy behaviors and reduce risk-taking behaviors. The report next presents an assessment of the need for preconceptional and prenatal care. This section profiles use of such care in California, highlights some risk behaviors and exposures that could be addressed by such care, and reports on pregnancy outcomes in California that may have an impact on early childhood development. The report then addresses service system capacity, describing major programs that fund or provide preconceptional and/or prenatal care, and family planning. Gaps and barriers to access for such care are also discussed. The report then explores the fragmentation of service delivery, between family planning and other reproductive health services, between reproductive and non-reproductive health services, and between reproductive health care and children's health care. The report concludes with recommendations to Proposition 10 commissioners for addressing needs, gaps and barriers for preconceptional and prenatal care, including promoting outreach, enhancing service capacity, providing psychosocial support at different levels, enhancing service coordination and system integration, and

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funding evaluation and research. The report's appendix provides a partial list of organizations and Web sites for perinatal programs in California. (Contains 141 references.) (HTH)

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Building Community Systems for Young Children

Building Community Systems for Young Children is a series of reports designed to support the implementation of Proposition 10: The California Children and Families Act. Each installment is written by a team of experts and provides comprehensive and authoritative information on critical issues concerning young children and families in California.

January 2001

Where It All Begins:
The Impact of Preconceptional and Prenatal Care on Early Childhood Development

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Table of Contents

I. Introduction and Background 1

II. Impact on Early Childhood Development 1

III. Needs Assessment 12

IV. Service System Capacity 16

V. Gaps and Barriers to Preconceptional and Prenatal Care 20

VI. Systems Fragmentation and Missed Opportunities 24

VII. Recommendations 27

VIII. References 34

IX. Appendix 39

X. Annotations and References to Tables 2 and 3 41

Where It All Begins:
The Impact of Preconceptional and Prenatal Care on Early Childhood Development

I. Introduction

In 1998, California voters approved Proposition 10: The California Children and Families First Act to add a 50-cent tax on cigarettes and tobacco products. The monies generated are intended to improve early childhood development from age zero to five. Specifically, Proposition 10 monies will be used to support programs that address health care services (prenatal, postnatal and child), parental education and support services, and child care programs. In terms of early childhood development, the starting point from age zero to five is not birth but long before. If the zero to five period is viewed as a race, then the outcome may be decided by events that occur long before birth, and even before conception. Care of women of reproductive age prior to conception and prenatal care are the cornerstones to a healthy start.

The purpose of this report is to point out that early childhood development begins before an infant is born or even conceived. To this end, this report will:

- Review the literature on the impact of preconceptional and prenatal care on early childhood development.
- Assess population needs and describe the service delivery system in California.
- Identify gaps, barriers, and missed opportunities.
- Recommend strategies for Proposition 10 Commissions to invest in preconceptional and prenatal care to ensure that all children in California get a healthy start.

II. Impact on Early Childhood Development

In this section, we will review the literature on the impact of prenatal and preconceptional care on early childhood development.

Prenatal Care

What Is Prenatal Care?

In 1986, as part of its effort to improve infant health, the U.S. Public Health Service assembled an Expert Panel on the Content of Prenatal Care. The Expert Panel recommended three basic components of prenatal care (Expert Panel on the Content of Prenatal Care 1989; see also Merkatz 1990):

- Early and continuous risk assessment
- Health promotion
- Medical and psychosocial interventions and follow-up

Prenatal Care Prevents Maternal and Infant Mortality and Morbidity

Healthier mothers and infants are considered one of the 10 great public health achievements in the United States in the last century (CDC 1999). Since 1900, maternal mortality has decreased 99%, and infant mortality 90%. Prenatal care has been hailed as a cornerstone of that achievement; its contribution of prenatal care to the making of mothers and babies healthier is undeniable. Examples of how prenatal care has reduced infant morbidity and mortality include the following (Goldenberg 1992, Stubblefield 1999):

- Giving blocking antibodies (Rh_o(D) immune globulin) to prevent at-risk pregnant women from forming antibodies against their own babies (Rh isoimmunization and *erythroblastosis fetalis*).
- Screening and treating maternal syphilis to prevent congenital syphilis in the baby.
- Screening and treating maternal HIV infection to prevent transmission to the baby.
- Detecting and treating toxemia (pre-eclampsia) early to prevent maternal and perinatal complications.
- Detecting and treating maternal juvenile diabetes mellitus to prevent maternal and perinatal complications.
- Accelerating fetal lung maturation by giving antenatal corticosteroids to women in preterm labor.

Prenatal Care Can Prevent Birth Defects

Birth defects are the leading cause of infant mortality in the United States. They affect 3.6% of all newborns (Stoler 1999). That constitutes nearly 150,000 babies in the United States and 18,000 babies in California that are born with a major birth defect each year. Some of the most common birth defects include cleft lip and palate, cerebral palsy, Down syndrome, congenital heart disease and neural tube defect.

Although *structural* development of most organ systems in the fetus is complete by day 56 after conception, *functional* development of many systems, particularly the central nervous system, continues throughout pregnancy and well into early childhood. For example, the adverse effect of maternal alcohol consumption on the developing central nervous system persists throughout pregnancy. Providing counseling, referral and treatment options for treatment of maternal alcohol consumption during routine prenatal care can potentially prevent mental retardation and other birth defects related to fetal alcohol exposure.

Prenatal care also reduces birth defects through secondary prevention. The California triple marker screening program provides a case in point. This is a program to identify Down syndrome, neural defects and other chromosomal anomalies by using blood tests early in the second trimester. It averted nearly 2,000 cases of Down syndrome, neural tube defect, and other

major birth defects between 1995 and 1997 (Cunningham 1999). It has been shown that for every dollar spent on the California triple marker prenatal screening program, $2.69 is saved in cases of neural tube defects and Down syndrome prevented.

Prenatal Care Can Reduce Low Birthweight and Prematurity

Low birthweight (weighing less than 2,500 grams or 5.5 pounds) and prematurity are the second leading causes of infant mortality in the United States, and the leading causes among African Americans (MacDorman 1999). Prematurity is responsible for half of all congenital neurological disability in children. Low-birthweight infants are at increased risk for chronic pulmonary disease, visual and hearing impairment, neurodevelopmental handicaps, learning difficulties resulting in school failures, abuse and neglect, and recurring illness (McCormick 1985, 1999). Nearly two-thirds of neonatal and infant deaths in the United States and in California occur in the low-birthweight population. Prematurity and intrauterine growth restriction are the most common causes of low birthweight. Prenatal diagnosis and intervention can significantly lower the incidence of intrauterine growth restriction.

Experts disagree on the contribution of prenatal care in preventing low birthweight and prematurity (Goldenberg 1992, Alexander 1995, Fiscella 1995, Savitz 1999). Several studies have shown that women who receive no prenatal care or inadequate numbers of prenatal care visits are more likely to deliver low-birthweight and premature infants, as compared to women with adequate prenatal care (Gortmaker 1979, Quick 1981, Showstack 1984, Shiono 1986, Scholl 1987, Murray 1988, Tyson 1990, Schramm 1992, Kogan 1994, Kotelchuck 1994, Mustard 1994). However, other studies have failed to show a that adequate care produces a benefit (Terris 1974, Malloy 1992, Parker 1994, Raine 1994). In the studies that show a correlation, prenatal care was associated with a risk reduction in low birthweight by one-third to two-thirds. These studies, however, have been criticized for their failure to account for self-selection in the use of prenatal care (Frick 1996, Liu 1998).

As our understanding of low birthweight and preterm birth grows, so will the effectiveness of prenatal care. For example, evidence is accumulating that screening and treatment of certain types of infections (asymptomatic bacteruria, bacterial vaginosis, sexually transmitted infections, periodontal diseases), especially among high-risk women, may reduce the risk of preterm birth (Hauth 1999). Increasing understanding of the role stress plays in causing preterm birth may guide the development of more effective prenatal interventions aimed at stress reduction (Lobel 1992, Hobel 1998, Dunkel-Schetter 1998). Improving our know-how in helping women quit smoking during pregnancy also holds great promise in reducing low birthweight and prematurity.

Prenatal Care Can Promote Healthy Behaviors

National prenatal care guidelines stress that prenatal care provides an opportunity to improve not only the immediate outcomes of pregnancy, but also the continuing health of the woman, the infant, and the family (Expert Panel on Prenatal Care 1989). It was observed that because "most women seek prenatal care at some point during their pregnancies, prenatal care provides a

wonderful opportunity for education that can benefit all members of the family and for bringing the family into ongoing health care supervision." This is especially important for low-income women and families, whose access to health care and health education may be limited to pregnancy and emergencies only.

Prenatal care provides a wonderful opportunity to promote healthy behaviors. Examples include good nutrition, regular exercise, infant safety, home safety, regular check-ups and immunizations. These lessons are the building blocks of good parenting. For eligible low-income pregnant women in California, health promotion and nutrition services are provided in an accessible and comprehensive package through CPSP (Comprehensive Perinatal Services Program, see below).

One healthy behavior that prenatal care promotes is breastfeeding. Breastfeeding has been shown to significantly reduce morbidity during infancy and childhood. Breastfed infants have lower rates of ear and respiratory infections, bacterial meningitis, urinary tract infections, necrotizing enterocolitis, diarrhea, atopic skin disorders, food allergies, asthma, diabetes mellitus, Crohn's disease, ulcerative colitis, lymphoma, and hospital admissions than their bottle-fed counterparts (Beaudry 1995, Teele 1989, Koopman 1985, Zeiger 1986, Popkin 1990, Howie 1990, Duncan 1993, Cunningham 1991, Lanting 1994, Wright 1995). Breastfeeding may also contribute to improved early cognitive development (Lucas 1992, Rogan 1993, Horwood 1998).

Women who received prenatal education and support regarding breastfeeding are significantly more likely to initiate breastfeeding (Halpern 1972, Newton, Hader 1977, Kistin 1990). A recent national survey showed that women who were encouraged by their provider to breastfeed were more than four times as likely to initiate breastfeeding, compared to women who did not received prenatal encouragement (Lu 2000). Because of their unique relationship with the pregnant woman, prenatal care providers can play an important role in promoting breastfeeding.

Prenatal Care Can Reduce Risk-Taking Behaviors

All parents want their babies born healthy. Pregnancy provides an opportunity for those that engage in risky behaviors to reduce or stop doing them. Prenatal care provides a unique window of opportunity for counseling, education and linkages to resources to help pregnant families stop unhealthy behaviors, such as tobacco, alcohol, and other drug use.

Tobacco has been identified as the leading preventable cause of low birthweight (ACOG 1995). Maternal cigarette smoking is associated with low birthweight, preterm birth, sudden infant death syndrome (SIDS), and respiratory tract infections during infancy and childhood. Maternal alcohol consumption is the leading preventable cause of birth defects and childhood disability (Ebrahim 1998). Perinatal substance exposure has been linked to many obstetric and neonatal complications, including low birthweight, prematurity, abruptio placentae, fetal distress, stillbirth, cerebral infarctions, congenital malformations, and neurobehavioral dysfunction (Oro 1987, Finnegan 1988, Dixon 1989, Chasnoff 1986, Chasnoff 1989, Kay 1989, Little 1988, Little 1989, Little 1990, Gillogley 1990, Calhoun 1991).

One study found that 8.8% of women in California smoked cigarettes during pregnancy, 6.7% used alcohol, and 5.2% used illicit drugs (Vega 1993). Among African-American women, tobacco use was found in one out of five women (20.1%), alcohol use in one out of nine (11.6%), and cocaine use in one out of 13 (7.8%). Substance-using pregnant women often lack adequate prenatal care. Prenatal care has also been shown to reduce the obstetrical and neonatal complications of perinatal substance use (Calhoun 1991, Phibbs 1991, McGregor 1989).

Examples of other risk-taking behaviors that prenatal care may prevent or stop include eating disorders, unsafe sexual practices, and not wearing seatbelts. Another dangerous behavior that prenatal care can reduce or avert is family violence. Between 1% to 20% (average of 4% to 8%) of pregnant women report being abused during pregnancy (Gazmararian 1996). Because pregnancy may be the result of sexual coercion, violence often escalates during pregnancy. Battering during pregnancy has been associated with poor obstetric outcomes, inadequate maternal weight gain, anemia, first- or second- trimester bleeding, infection, miscarriage, stillbirth, preterm birth, low birthweight, placental abruption, and maternal and fetal injuries, including fractures. Studies have documented that child abuse occurs in half of all households where the woman is abused. Prenatal care provides an opportunity to identify violence and can also provide an opportunity to break the cycle of abuse and violence and provide safety options for the mother and baby by routinely screening, referring, and reporting abuse.

Prenatal Care Prepares Parents for Parenting

A major goal of Proposition 10 is to provide parental education and support. Many parents find themselves ill prepared for parenting after the birth of their infant; the demands of caring for a new child often reduce the opportunity and motivation to attend parenting classes. Prenatal care provides the perfect opportunity to begin parental education and support. For example, one study found patient education on newborn hepatitis B immunization more effective and acceptable when given during prenatal care than during the peripartum period (Zola 1997). Unfortunately, this opportunity is often missed because obstetricians and other prenatal care providers may be ill-prepared themselves to provide parental education and support, and such resources may not be available during prenatal care (see below).

Recent work on fetal psychology and the genesis of parent-infant bonding prior to birth has also highlighted additional opportunities. Behavior is believed to be influenced prior to birth, with fetuses responding to maternal voice, stress and hormone levels, dietary habits and movement (Hopson 1998). Parenting education during pregnancy may thereby influence neurobehavioral development of the child *in utero* and set some of the parameters for the postnatal relationships.

Prenatal Care May Have Life-Long Benefits

Current interest in enhancing early childhood development has been generated largely by the recognition of the plasticity of brain development, and the development of other organ systems, in early childhood. Early childhood is seen as both a window of opportunity and a window of vulnerability. It is thought that enhancing "hardwiring" during this critical period of plasticity may

optimize the functional capacity of the brain and other organ systems in later life. Conversely, deficits during this window of vulnerability may diminish future cognitive development.

This may also be true before the baby is born; the prenatal period may also be a window of great opportunity and vulnerability. The work of David Barker and others has highlighted the impact of prenatal influences on adult chronic disease. Barker and colleagues found that birthweight, placenta size, and weight gain and growth in the first year of life are associated with cardiovascular disease and other chronic illness in the fifth and sixth decade (Barker 1998, Barker 1989, Rich-Edwards 1997, Martyn 1996). They suggest that these early experiences "program" response patterns that have life-long consequences. It is possible that these early experiences may also program future cognitive development. In light of these studies, prenatal care may take on a greater role in promoting not only early childhood development, but also health and well-being in adulthood.

Preconceptional Care

What Is Preconceptional Care?

National guidelines for prenatal care recommend that to ensure the health of the woman and the developing fetus, preconceptional care should be an integral part of prenatal care (Expert Panel on the Content of Prenatal Care 1989). *Preconceptional care* is the process of identifying those conditions that could affect a pregnancy but may be ameliorated by early intervention prior to conception and the commencing of routine prenatal care. Components of preconceptional care should include the following (ACOG 1995, Cefalo 1995):

- Systematic identification of preconceptional risks through assessment of reproductive, family, and medical histories; nutritional status; tobacco, drug and alcohol exposures; and social concerns of all fertile women.
- Provision of education based on risks.
- Discussion of possible effects of pregnancy on existing medical conditions for both the prospective mother and the fetus, and introduction of interventions, if appropriate and desired.
- Discussion of genetic concerns and referral, if appropriate and desired.
- Determination of hepatitis status and immunization, if indicated.
- Laboratory tests, as indicated.
- Nutritional counseling on appropriate weight for height, sources of folic acid, and avoidance of vitamin oversupplementation; referral for in-depth counseling, if appropriate and desired.
- Discussion of social, financial, and psychological issues in preparation for pregnancy.
- Discussion regarding desired birth spacing and real and perceived barriers to achieving desires, including problems with contraceptive use.
- A recommendation to the patient to keep a menstrual calendar.
- Emphasis on importance of early and continuous prenatal care and discussion of how care may be structured based on the woman's risks and concerns.

Preconceptional Care Can Prevent Birth Defects

The heart of a fetus begins to beat 22 days after conception, the neural tube is closed 28 days after conception, and the oral palate is fused 56 days after conception (Moore 1988). The critical period for cell differentiation and organ development occurs between days 17 and 56, during which time the developing fetus is particularly vulnerable to external influences that may cause ***structural*** birth defects.

Given that few women initiate prenatal care before day 17 and many women do so after day 56, the most promising strategy to prevent birth defects is through the implementation of preconceptional care programs. For example, preconceptional use of folic acid has been shown to significantly reduce the risk of neural tube defects (Milunsky 1989, MRC 1991, Czeizel 1992, Werler 1993, Shaw 1995, Czeizel 1996). Women with diabetes mellitus who received preconceptional care were found to have better control of blood sugar in early pregnancy, and fewer hospitalizations during pregnancy (Herman 1999, Garcia-Patterson 1997, Kitzmiller 1991, Rosenn 1991), and their babies were significantly less likely to have major birth defects (Garcia-Patterson 1997, DCCT 1996). Studies have also found that preconceptional or very early prenatal dietary control was associated with decreased incidence of birth defects associated with phenylketonuria (PKU) than was later prenatal dietary control alone (Smith 1990, Brenton 1996, Cipcic 1996).

Table 1 gives some examples of how preconceptional care could prevent birth defects.

Table 1: How Preconceptional Care Could Prevent Birth Defects		
Risk Factor	*Major Birth Defects*	*Preconceptional Interventions*
Maternal phenylketonuria (PKU)	Mental retardation, Microcephaly	Dietary restriction
Ethanol	Fetal alcohol syndrome, Mental retardation	Cessation of alcohol use prior to pregnancy
Cocaine	Congenital urogenital anomalies	Cessation of cocaine use prior to pregnancy
Diabetes mellitus	Neural tube defects, Cardiac anomalies	Screening & control of blood sugar
Rubella	Mental retardation, Congenital deafness, Congenital cataracts	Rubella vaccination prior to pregnancy
Accutane	Central nervous system & Cardiac defects, Craniofacial defects	Cessation of use prior to pregnancy
ACE inhibitors	Renal disease	Change in anti-hypertensive therapy
Fragile X syndrome	Mental retardation	Genetic screening & counseling
Cystic fibrosis	Lung disease	Genetic screening & counseling

Preconceptional Care Can Prevent Low Birthweight and Prematurity

It has been observed that "[p]erhaps too much is expected of prenatal care" (Goldenberg 1992). To expect prenatal care, in less than nine months, to reverse the impact of all risk exposures (poor nutrition, stress, infections and depressed immunity, poor general health, environmental exposures, etc.) that have accumulated over a woman's life course on birth outcome may be expecting too much. It has been argued that effective interventions for prevention of low birthweight and prematurity need to reduce these risk exposures over the life course of the woman, and not just during pregnancy. This is where preconceptional care can make a difference. As has been observed (Alan Guttmacher Institute 1993),

> The nation would be well served by making a commitment to advance preconceptional services to a similar extent as it has prenatal care. Preconception care, focused on women's overall health and risk assessment and risk reduction prior to pregnancy, will serve as a key component of the next wave of low-

birthweight and infant mortality reduction strategies – and may provide increased savings beyond those experienced from prenatal care alone.

For example, low pre-pregnancy weight of the mother is a significant risk factor for preterm birth of the infant. Women with low pre-pregnancy weight, especially adolescents, could benefit from nutritional support and counseling during the preconceptional period. Smoking is a significant risk factor for low birthweight. Quitting smoking before pregnancy may significantly reduce the risk of low birthweight in the infant.

Preconceptional Care Can Prevent Poor Pregnancy Outcomes and Their Recurrence

A woman with a prior poor pregnancy outcome is at significant risk for having another suboptimal outcome the next time she gets pregnant. *Interconceptional care* — preconceptional care for women between pregnancies — may prevent recurrence of some poor pregnancy outcomes. For example, for a woman who had a baby affected by neural tube defect, her recurrence risk during the next pregnancy can be reduced in half by taking 4 mg of folic acid daily starting at least one month prior to the pregnancy (CDC 1991). In addition to providing primary prevention of birth defects, early intervention through preconceptional care can improve preexisting conditions that adversely affect pregnancy and birth outcomes, such as maternal hypertension, diabetes mellitus, phenylketonuria and infection. A cost-benefit analysis found that for every dollar invested in preconceptional care for women with pregestational diabetes mellitus, $1.86 is saved in costs associated with adverse maternal and neonatal outcomes (Elixhauser 1993).

In July 1998, the Alameda Alliance for Health (a local non-profit Medi-Cal managed care plan) completed a three-year effort designed to demonstrate improved maternal and neonatal health outcomes for women with pregestational diabetes. The Diabetes and Pregnancy Demonstration Project provides comprehensive services to *all* women with a history of diabetes. This was based on the premise that there are missed opportunities for primary prevention if only women who are self-referred or planning their next pregnancy are targeted. The primary goal of the program was to produce maternal and neonatal outcomes similar to those of their non-diabetic population. The goal was achieved by utilizing primary care management model, incorporating guidelines for preconceptional care as well as utilizing the California Diabetes and Pregnancy Program's Sweet Success guidelines for prenatal care (California Diabetes and Pregnancy Program 2000).

Preconceptional Care Can Promote Healthy Behaviors and Reduce Risk-Taking Behaviors

Preconceptional care offers an opportunity to promote healthy behaviors and lifestyle, such as good nutrition, stress reduction and preventive health (e.g., periodic cancer screening) before a woman gets pregnant. It also offers an opportunity to reduce risk-taking behaviors.

Risk-taking behaviors are common among women of reproductive age in California. In 1997, nearly 20 percent of women in California between the ages of 18 and 44 smoked, the highest percentage in the last five years (California Department Health Services, BRFS survey and Women's Health Survey, 1998). Even more alarming for the future is that the use of nicotine products is rising among female teens (CDHS 1997). The percent of women who report an average intake of two or more drinks a day has declined to about 5 percent among women of reproductive age in California (CDHS 1997). However, binge drinking remains high among women of reproductive age: 15 percent of women aged 18 to 24, 11 percent of women aged 25 to 34, and 8 percent of women 34 to 44 report taking five or more alcoholic drinks on at least one occasion during the past month (CDHS 1997). The use of marijuana, cocaine, heroine, amphetamines, and other drugs of abuse can affect pregnancy outcome. Reliable statistics on illicit drug use are difficult to obtain, but national surveys put marijuana use just behind that of tobacco. Cocaine use in California is approximately one-third that of marijuana. The 1990 National Household Survey on Drug Abuse found that 21 percent of women aged 18 to 25 and 15 percent of women aged 26 to 35 reported having used marijuana at least once in the previous year (US DHHS 1991b). In the same survey, cocaine use was reported to be 4.6 percent among women in those age groups. Routine health histories seldom include specific questions about the use of illicit drugs (Cefalo 1995). The American College of Obstetricians and Gynecologists recommends that all women should be asked about their use of illicit drugs, tobacco, and alcohol during a routine visit to the doctor's office (ACOG 1995, 1996).

Interconceptional Care

Once the baby is born, *interconceptional care* provides an opportunity to reinforce healthy behaviors learned from preconceptional and prenatal care. Just as parents may be more motivated to reduce risk behaviors during prenatal care, they may also be similarly motivated to do so after the baby is born. For example, parents of newborns may be more receptive to counseling and referral for smoking cessation. The adverse impact of maternal smoking on children's health continues after birth. Children have an increased risk of sudden infant death syndrome (SIDS) if their mothers smoke. Secondhand smoke is responsible for between 150,000 and 300,000 lower respiratory tract infections in infants and children under 18 months of age annually, and results in between 7,500 and 15,000 hospitalizations each year. Interconceptional care provides an opportunity to reinforce smoking cessation.

Interconceptional care also presents the opportunity to identify women at risk or manifesting symptoms and signs of depression or other mental illness. Because of the impact of maternal depression on her health, that of her child, and the maternal-child relationship, interconceptional care offers an often-missed opportunity for identification of and referral for maternal depression. This is an important emerging issue that may be of particular interest to Proposition 10 commissioners.

Preconceptional Care Prepares and Reinforces Parents for Parenting

Preparation for parenting should start preconceptionally. As discussed earlier, many first-time parents are ill prepared for parenting. Preconceptional care provides an opportunity for parents planning a pregnancy to learn about good nutrition, healthy lifestyle, home safety, and so forth. For parents who have already had a child, interconceptional care provides an opportunity to provide support and reinforcement for good parenting.

Preconceptional and Prenatal Care Can Promote Family Planning

Our review of the impact of preconceptional and prenatal care on early childhood development would be incomplete without a discussion of the benefits of family planning. Family planning is an integral part of preconceptional and prenatal care, and has a far-reaching impact on improving neonatal and child health outcomes. Because Proposition 10 specifically prohibits the use of its monies for family planning services, we will limit our discussion and refer interested readers to an excellent review of the impact of family planning and unintended pregnancy on children's health published by the Institute of Medicine (Brown 1995).

The use of effective family planning methods protects against unintended pregnancy. Children whose conceptions were unintended exhibit higher levels of fearfulness and lower levels of positive affect by age 2 (Baydar 1993). They have lower scores on verbal development tests at preschool age. It is hypothesized that this critical developmental skill is lagging because "significant adults, particularly the mother, may be less available" to children whose conceptions are unintended (Baydar 1993). These children receive less stimulation for cognitive and affective development. Long-term studies found that children born as a result of an unwanted pregnancy perform less well in schools, achieve lower educational attainment, and have greater psychological problems than children whose births were planned and wanted (Forssman 1981, Blomberg 1980, Hook 1975, Myhrman 1988, Myhrman 1995, Kubicka 1994, David 1988, Matejcek 1978). These differences persist even after controlling for family background characteristics.

Unintended pregnancy is associated with several other factors that adversely affect children's health and development, including:

- Short interpregnancy interval.
- Inadequate utilization of preconceptional and prenatal care.
- Increased risk exposures during pregnancy (cigarette, alcohol and other drug use).
- Low birthweight.
- Single parenthood.
- Decreased parental resources and parent-child interactions.
- Family violence and child abuse.
- Economic strains on the family and childhood poverty.

Given the importance of family planning to children's health, Proposition 10 commissions need to consider how they can potentially link and coordinate family planning services with the other preconceptional and prenatal services they may be providing or supporting, even if they do not fund family planning services themselves (see below).

Summary

Preconceptional and prenatal care, when integrated with effective psychosocial, nutrition and education efforts at the family, community and state policy levels could play a significant role in early childhood development by averting major maternal and infant morbidity and mortality. Preconceptional and prenatal care prevent birth defects and also reduce the risk of low birthweight and prematurity, which account for the majority of infant deaths and childhood disabilities. It promotes healthy behaviors and reduces risk-taking behaviors. It also provides an important opportunity for parental education and support. The impact does not stop at birth; recent evidence suggests that the benefits of preconceptional and prenatal care on health and development may extend well into adulthood. This is where early childhood development begins – the time before each baby is conceived or born.

In building systems of early childhood services, preconceptional and prenatal care must be key concepts, with functional and organizational strategies to integrate these essential services with nutritional support (such as WIC[1]), pediatric care, parenting supports, education and family resources.

III. Needs Assessment

In this section, we present an assessment of the need for preconceptional and prenatal care. We will first profile utilization of care in California. We will then highlight some risk behaviors and exposures, both preconceptionally and during pregnancy, that could be addressed by preconceptional and prenatal care. Lastly, we will report on pregnancy outcomes in California that may have an impact on early childhood development.

Preconceptional and Prenatal Care Utilization in California

The California Department of Health Services reported that nationally, only 2% of pregnant women used preconceptional care prior to pregnancy. The extent to which Californians used preconceptional care is not known. In 1997, 95% of Californians used some prenatal care during pregnancy. Four out of five women (81.8%) began prenatal care in the first trimester, up from 72.6% in 1988. More than three-fourths of women (78%) had adequate or better-than-adequate prenatal care, 10% had care that was considered marginally adequate, and 12% had inadequate

1 See another report in this series, Whaley S and L True, *California WIC and Proposition 10: Made for Each Other*, N Halfon, E Shulman, M Shannon and M Hochstein, eds., UCLA Center for Healthier Children, Families and Communities, 2000, for a discussion of the potential role of WIC in delivering a variety of early childhood services.

care. Women who had low-birthweight babies were significantly more likely to have had inadequate prenatal care (CDHS 1999).

Despite the improvement in prenatal care utilization, significant disparities in its use persisted among different populations in California (CDHS 1999). In 1997,

- 88% of white women, 84% of Asian-American women, 79% of African-American women, 77% of Hispanic-American women, and 71% of Native-American women began prenatal care in the first trimester.
- 90% of women who had 13 years of education or more had early prenatal care, as compared to 76% for women who were less educated.
- 70% of pregnant teens under 20 years of age and 83% of women age 20 to 44 obtained early prenatal care.
- 87% of married women had early prenatal care, compared to only 72% of unmarried women.
- 90% of pregnant women with Blue Cross/Blue Shield, and HMO, or private health insurance coverage obtained early prenatal care, while the rate was only 74% for women whose prenatal care was paid for by Medi-Cal.

Preconceptional and Prenatal Risk Behaviors and Exposures

The need for preconceptional care is highlighted by the following examples of risk behaviors and exposures that many women in California carry with them into their pregnancy, based on the California Behavioral Risk Factor Survey (CDHS 1998). In 1997,

- 14.3% of women age 18 to 44 were underweight (body mass-to-height index of less than 19.8).
- 24.2% of women age 18 to 44 were overweight (body mass-to-height index of greater than 26).
- 68.8% of women age 18 to 44 reported exercising less than three times a week in the last month, and 22.6% of women reported not exercising at all.
- 19.9% of women age 18 to 44 were current smokers.
- 12.4% of women age 18 to 44 reported binge drinking (five or more drinks on one occasion in the past month), and 2.9% reported chronic drinking (60 or more alcoholic beverages in the past month).
- 12.7% of women age 18 to 44 reported engaging in behaviors at high or medium risk for HIV infection.
- 4% of women reported having ever been told by a physician that they had gestational diabetes, 1.4% other diabetes, and 9.4% hypertension.

Since only 2% of women obtain preconceptional care, i.e., seek care, assistance and counseling deliberately in preparation for a pregnancy, a significant number of pregnancies are at risk for birth defects, low birthweight and other adverse birth outcomes from the start. As discussed in the previous section, these are all risk exposures that preconceptional care can address.

Some of these risk exposures continue into pregnancy and after delivery. For example:

- 8.8% of women presenting for delivery reported using tobacco during pregnancy, 6.7% of women tested positive for alcohol, and 5.2% tested positive for illicit substances (Vega 1995).
- Only 41.3% of women breastfeed their infants exclusively at hospital discharge (CDHS 1999).

There are also significant disparities in risk exposures among different populations. For example:

- The teen birth rate in California was 14 per 1,000 for white women age 15 to 17, 48 for African Americans, and 64 for Hispanic Americans (CDHS 1999).
- 20% of African-American women presenting for delivery in California reported smoking cigarettes during pregnancy, 12% tested positive for alcohol, and 14% tested positive for illicit drugs. The rates for white women presenting for delivery were 15%, 6%, and 7%, respectively (Vega 1995).

Pregnancy Outcomes

The infant mortality rate in California has declined significantly in the past decade, from 7.9 per 1,000 live births in 1990 to 5.9 in 1997. But this decline was not accompanied by a comparable decline in low-birthweight and very-low-birthweight births. Between 1989 and 1997, the percentage of low-birthweight births has increased by 6%, and that of very-low-birthweight births increased by 11%. Significant disparities persisted among different populations in birth outcomes (CDHS 1999):

- An African-American baby born in California is more than twice as likely to die within the first year of life as a white baby.
- African-American women in California are more than twice as likely to give birth to a low-birthweight baby as white women.
- Women who completed less than 12 years of education are more likely to give birth to a low-birthweight baby than women who completed 12 years or more.
- Uninsured women and women who have Medi-Cal are more likely to give birth to a low-birthweight baby than women who have private insurance.

In general, women who have the greatest risk exposure or the worst pregnancy outcome, and who are most likely to benefit most from prenatal care, are also least likely to get early and adequate prenatal care (see above).

The following two tables present a report card on the state of perinatal health in California. Table 2 compares our perinatal health with that of the rest of the nation, and with Healthy People 2010 goals. The selected indicators are defined on page 47.

Table 2: Reproductive Health Status of Californians, 1997			
Indicators	*United States*	*California*	*Healthy People 2010 Goal*
Infant Mortality Rate (per 1000 LB)	7.2[1]	5.9[2]	5.0
Maternal Mortality Ratio (per 100,000 LB)	7.6[3]	9.1[4]	3.3
Low Birthweight Rate (%)	7.6[1]	6.1[2]	5.0
Preterm Birth Rate (%)	11.0[1]	NA	7.6
1st Trimester Prenatal Care (%)	82.8[1]	80.8[2]	90
Smoking During Pregnancy (%)	13.2[5]	8.8[6]	5
Substance Use in Pregnancy (%)	10-17[5]	5.2[6]	0
Breastfeeding Initiation (%)	60[7]	NA	75
Abuse During Pregnancy (%)	4-8[8]	NA	NA
Teen Birth Rate (15-19)	65.0[1]	56.7[2]	NA

LB = live births
NA = not available

Table 3 highlights racial and ethnic disparities in perinatal health in California.

Table 3: Selected Indicators in Reproductive Health in California by Race/Ethnicity, 1997

Indicator	*African American*	*Asian/PI American*	*Hispanic American*	*Native American*	*White American*
Infant Mortality Rate (per 1000 LB)[2]	13.3	4.0	5.7	3.8	5.4
Neonatal Mortality Rate (per 1,000 LB)[2]	9.0	2.5	3.8	1.5	3.6
Low Birthweight Rate (%)[2]	12.1	6.8	5.6	5.7	5.5
1st Trimester Prenatal Care (%)[2]	79	84	77	71	88
Smoking During Pregnancy (%)[6]	20.1	1.7	3.3	NA	14.8
Alcohol Use in Pregnancy (%)[6]	11.6	5.1	6.9	NA	6.1
Drug Use During Pregnancy (%)[6]	14.2	1.8	2.8	NA	6.8
Teen Birth Rate (15-17)[2]	46.1	13.7	68.0	44.1	14.0

Clearly, not every child in California is getting a healthy start. Proposition 10 gives great hope that we can begin to address needs and eliminate disparities in perinatal health.

IV. Service System Capacity

In this section we will describe major programs funding or providing prenatal care, preconceptional care, and family planning in California. The purposes of this section and the next section (V) are twofold:

- To familiarize Proposition 10 commissioners with the current service system in preconceptional and prenatal care; and
- To help Proposition 10 commissioners identify barriers, gaps and missed opportunities in promoting early childhood development through preconceptional and prenatal care.

As these two sections will point out, there are shortcomings in the current system that Proposition 10 commissions can consider in order to significantly improve access and enhance service delivery of preconceptional and prenatal care.

Prenatal Care

Private Insurance. The Pregnancy Discrimination Act of 1978 requires that most employer-sponsored group health insurance policies cover maternity care in the same manner they cover other medical conditions (Flint 1992). The law does not apply to women who are insured through small businesses with 15 or fewer employees, women with insurance coverage independent of employment, and non-spouse dependents. As a result, some 9% of women of reproductive age have private insurance policies that do not cover maternity care (Gold 1987). In addition, many women who have some insurance coverage find themselves with no coverage at all for their pregnancies because of restrictions such as waiting periods.

Medicaid. Created in 1965 as Title XIX of the Social Security Act, the Medicaid program has long been the primary public program supporting the provision of health care services to low-income Americans (Hill 1992). In California, Medi-Cal provides public funding of prenatal care for low-income women up to 200% of the federal poverty level. Medi-Cal funded the prenatal care and obstetric services of over half (51.2%) of all pregnant women in Los Angeles County in 1997 (DHS, County of Los Angeles 1999).

Medi-Cal is jointly administered by the federal and state governments. Its costs are shared (equally in California) by the federal and state governments. It operates as a financing program rather than a service delivery system. It is an open-ended entitlement program, and its open-ended nature has contributed significantly to its rapid growth. Throughout California the traditional fee-for-service Medi-Cal system is being transitioned into managed care programs. Various types of managed care programs exist.

Prior to Medi-Cal expansions in early 1999, financial barriers were commonly cited as the leading barrier to timely and adequate prenatal care (IOM 1988). Several steps have been taken to address the problem in California in the past decade. These include expansion of Medi-Cal eligibility (to all pregnant women with an annual household income of less than 200% of the federal poverty level, regardless of immigration status) and streamlining of the Medi-Cal eligibility process (e.g., granting presumptive eligibility to pregnant women who appear to be eligible for Medi-Cal benefits) (Hill 1992). Unfortunately, "pregnancy-only Medi-Cal" does not cover all tests and procedures that pregnant women, especially high-risk pregnant women, may require for care of their pregnancies. For those women receiving pregnancy-only Medi-Cal, full- scope medical services are not provided. Screening, treatment and prescriptions for preexisting medical conditions that potentially could compromise pregnancy outcomes, such as diabetes mellitus, hypertension and asthma, are not covered benefits under this program.

A decade ago, low participation of obstetricians and other prenatal care providers in Medi-Cal was cited as an important barrier to access to prenatal care. Enhanced reimbursement, along with

inducement of additional reimbursement through participation in the Comprehensive Perinatal Services Program (CPSP), has significantly increased provider participation in Medi-Cal. In Los Angeles County alone, there were 432 state-certified CPSP providers in 1999.

Comprehensive Perinatal Services Program (CPSP). CPSP is a bundle of multidisciplinary comprehensive services assessing the medical, psychosocial, nutritional and health education risk of pregnant Medi-Cal recipients. Prior to managed care, prenatal care providers were reimbursed for providing these additional risk-assessment services throughout prenatal and postpartum care.

Under the traditional fee-for-service system, CPSP has helped improve access to prenatal care by increasing reimbursement to stimulate provider participation. The number of providers accepting Medi-Cal patients has increased significantly over the past decade. In Los Angeles County alone, there were 432 state-certified CPSP providers in 1999. The efficacy of CPSP in increasing prenatal care utilization and improving birth outcomes has been well documented (Korenbrot 1995).

The impact of the transition to Medi-Cal managed care on enhanced prenatal services under CPSP is not yet known. Under the current managed care system, prenatal care providers must offer CPSP to all pregnant Medi-Cal beneficiaries without the added monetary incentive to provide such care (additional reimbursement or an enhanced capitation rate). Concerns have been voiced about the quality of these CPSP services under managed care, and the extent to which managed care providers actually follow CPSP guidelines for assessment and intervention.

Access to Infants and Mothers (AIM)
The AIM program provides low-cost health insurance coverage to moderate-income pregnant women and their infants. AIM is part of California's efforts to increase health coverage of pregnant women and their infants. The average subscriber is a married woman, living in a household with a family income between 200 and 225% of the federal poverty level. Since the program began in 1992, it has served over 40,000 pregnant women and their infants. A pregnant woman and her infant(s) enrolled in AIM receive their care from one of nine health plans participating in the program. The pregnant woman participates in the cost of her health care services through a low-cost subscriber contribution. The state of California supplements the subscriber contribution to cover the full cost of care. AIM is funded by $39 million from tobacco tax funds.

Maternal and Child Health (MCH) Block Grants (Title V). The purpose of the MCH block grants made to the states is to improve the health of all mothers and children in the nation. Created in 1935 as Title V of the Social Security Act, the most important change occurred in 1981 when seven separate categorical programs were consolidated to create a single MCH block grant. State governments contribute roughly $3 in matching funds for every $4 in federal funds they receive. Because it is not an entitlement program, state MCH block grants must operate within each year's appropriated budget. Federal law also dictates how a state may spend its MCH block grants so that no more than 30% of program dollars are spent on prenatal and maternity care.

Unlike Medicaid, which serves as a financing program, MCH block grants support direct service delivery in the public health setting.

Adolescent Family Life Program (AFLP). Funded by California's General Fund and the Federal Title V Maternal and Child Health Block Grant Funds of the state Department of Health Services, this program is available in 42 counties. These programs are located in a variety of settings (county health departments, hospitals, schools and community-based organizations) and are designed to benefit teen parents, their children and families, and the community in which they live. The overall goal of the program is to prevent subsequent pregnancies to teenage parents, increase the rate of high school graduation among teen parents, improve the health of the babies born to adolescent parents, and prevent pregnancies in the siblings of pregnant or parenting teen. Each program is uniquely designed to meet the needs of the teens in the community they serve and include: case management, social support services, mental health services, parenting education, and community awareness of the issues surrounding teen pregnancy.

Other Sources: There are two other major sources of public funding for prenatal care: the Community and Migrant Health Center Program (CMHC), and the Special Supplemental Food Program for Women, Infants, and Children (WIC). Created in 1965, CMHCs provide comprehensive primary care services to individuals and families who lack access to health care because of geographic isolation, provider shortage, or financial barrier. CMHCs have been found to reduce infant deaths by up to 40% in the communities they serve, mostly in rural areas.

WIC was created in 1972 to provide supplemental food to low-income pregnant women, nursing mothers, and children diagnosed as being at nutritional risk. WIC also provides nutritional education and counseling. WIC is administered by the Department of Agriculture's Food and Nutrition Service. Although, strictly speaking, WIC is not a perinatal health care program, participation in WIC has been shown to significantly reduce the chances of prematurity and low birthweight. A USDA study concluded that between $1.77 and $3.13 is saved in Medicaid costs for new mothers and their infants during the first 60 days after birth for every dollar spent on WIC (USDA 1990).

Preconceptional Care

At present, there is no public funding or program dedicated to preconceptional care for low-income women and families. The extent to which Medicaid, Family PACT, or Title X-funded providers are providing preconceptional care is unknown. The extent of coverage of preconceptional care by private health insurance plans, or the provision of preconceptional care by private providers, is also not known.

Family Planning

For men and women with health insurance that provides prescription-drug coverage, a new California law now requires every health plan in California to provide coverage for all FDA-

approved prescription contraceptive methods. For the uninsured, men and women with a household income of under 200% of the federal poverty level who are otherwise not eligible for Medi-Cal may receive contraceptive services through a state-only family planning program called Family PACT. Men and women with an income between 200 and 250% of the federal poverty level are eligible for family planning services through the federal Title X program. In addition, Title X monies are also used to serve special populations, such as substance-abusing women, homeless women, women with disabilities, and men with family planning needs.

Summary

As this review suggests, California now has multiple potential funding streams and programs to pay for an enhancement of the provision of prenatal care. The extent of coverage for preconceptional care is not known.

V. Gaps and Barriers to Preconceptional and Prenatal Care

The current system of reproductive health care has barriers and gaps in access, service and reimbursement. Given the importance of prenatal and preconceptional care to maternal and infant health, closing the gaps and overcoming the barriers must be included in any plan to enhance early childhood development.

Gaps

Although Medi-Cal expansion has significantly improved access to prenatal care in the past decade, many gaps in service still exist. While a comprehensive discussion of all the service gaps is beyond the scope of this report, some of the most important gaps have been identified. Closing these gaps is one of the best investments that Proposition 10 commissions can make in promoting early childhood development.

Preconceptional Care. The most glaring gap in reproductive health care is in preconceptional care. As discussed earlier, currently there is no system of public funding, administration and service delivery of preconceptional care for low-income women. The extent to which private health insurance covers preconceptional care is not known. Since this type of care represents potential missed opportunities to identify maternal health problems, institute interventions, and encourage primary and secondary prevention strategies, this type of care requires more attention by policymakers, health care providers and Proposition 10 Commissioners.

Parenting Education. Parenting education really should begin during preconceptional and prenatal care. Regardless of previous experiences, women and families from diverse cultural, social, and economic populations can benefit from parenting education. Components of parenting education should include normal newborn expectations (nutrition, sleep patterns, elimination habits), home and car safety, newborn immunization needs, parent-infant bonding techniques, and childhood cognitive development. In a recent review of patient education materials available through the

American College of Obstetricians and Gynecologists (ACOG), only one brochure focused on the aforementioned parent education needs (Car Seat Safety for You and Your Baby - Item #AP018). Although verbal instruction from a prenatal care provider is important, there is a gap in written materials and other presentation materials, including videos for pregnant families. Most prenatal care providers have neither the training nor the capacity to provide parenting education themselves. Additionally, parenting classes are often unavailable or unaffordable, especially for expecting parents or parents with infants and toddlers. Many health care plans provide family prenatal parenting classes for their enrollees, and other community-based organizations also can provide such parenting supports in the prenatal period. Unfortunately, at present prenatal parenting education is a hit-or-miss proposition. Several states have sought to include the provision of prenatal parenting classes as a benefit in their Medicaid program and have made such classes mandatory components of their Medicaid managed care contracts with conventional managed care organizations providing care to the Medicaid population. This potentially represents a strategy that the State of California could also pursue so that no pregnant woman who needs additional knowledge, skills and support regarding child rearing is left wanting. There are programs around the state that provide parenting education and child care for pregnant teens, such as the School-Age Parenting and Infant Development Program (SAPID) in the Los Angeles Unified School District, but they target pregnant teens only. There needs to be more parenting classes that are available and affordable to all expecting parents in California.

It is not enough to provide parenting education without support. New parents may need psychosocial support in coping with the stresses of parenthood. They may need social service support such as child care, flexible work hours, or extended paid parental leave (particularly for parents with sick, preterm, or multiple infants). The current system provides little psychosocial support for parenting.

Smoking Cessation Education. According to the Surgeon General, smoking is one of the most preventable causes of poor pregnancy outcomes in the United States (Quinn 1999). Class I evidence (from randomized controlled trials) supports the Class A (good) recommendation that all women identified as smokers should be referred to a smoking cessation clinic, group, or counselor. Few prenatal interventions have received such strong scientific endorsement.

One in 11 women in California reports that she smoked cigarettes during pregnancy; among African-American women in California the prevalence of smoking during pregnancy is one in five. Like parenting classes, smoking cessation programs are often unavailable or unaffordable to many parents. To our knowledge, no formal assessment of the service capacity has been conducted, there is an impression widely shared among prenatal care providers that the existing capacity does not adequately serve the need for smoking cessation among expecting parents. There need to be more smoking cessation programs that are affordable and available for expecting parents, especially in communities where smoking is prevalent. Many pregnant women smoke for psychological reasons – primarily as the means of coping with stress. Thus, there also need to be more programs and policies that address these psychosocial antecedents of smoking in pregnancy (see below).

Domestic Violence Prevention. One of the most important gaps is the lack of infrastructure to support screening for domestic violence. An estimated 4 to 8% (range 1 to 20%) of pregnant women are physically abused during pregnancy (Gazmararian 1996). The prevalence of violence against pregnant women is higher than that of pre-eclampsia, gestational diabetes, or most other major diseases in pregnancy. A conservative estimate of 20,000 to 40,000 women who give birth each year in California are physically abused during pregnancy (this could be as high as 100,000). Child abuse will occur in half of these families.

The first step to stopping the violence is screening. Through the CPSP risk-assessment process, women are questioned initially and each trimester (including the postpartum period) about past and present history of violence. However, women who choose not to receive CPSP services and those who receive care from private providers are not assessed to this extent. Once a woman who is being abused is identified; referrals are difficult because of the shortage of available shelters as well as limited numbers of shelters who accommodate pregnant and parenting women.

The law in California requires mandatory reporting once the provider identifies domestic violence. Reporting, however, may jeopardize the safety of the pregnant woman and her children. As many as half of batterers threaten retaliatory violence, and more than 30% may inflict assault during prosecution. Most importantly, coordinating support services for a battered woman and her children is time-consuming, time that is becoming ever more scarce for the clinician in a managed care setting. It is not surprising that many clinicians find it easier not to screen at all. Enhancing the service capacity and service coordination among the police, the judicial system, social service, Child Protective Services, shelters, and prenatal care providers is needed if we are to put a stop to family violence and child abuse.

Psychosocial Support at Family, Community and Social Levels. Perhaps the greatest gap is the relative lack of services, programs and policies that address the social and behavioral determinants of perinatal health. Today preconceptional and prenatal care are still largely clinical services delivered by the health care provider to the individual patient; even the health promotion and the psychosocial intervention components of prenatal care are targeted primarily toward individuals. But significant improvement in birth outcomes and early childhood development is unlikely to be achieved without addressing the social context of individual health and behavior (Smedley 2000). For example, getting a pregnant woman to attend smoking cessation classes may not be enough to get her to quit smoking. Services, programs and policies may need to address the psychosocial stress, environmental stressors and social norms that lead her to smoke cigarettes as a way of coping. Similarly, getting expectant parents to attend parenting classes may not be enough to make them good parents if they cannot get the support they need to be good parents, such as child care, flexible work hours, extended parental leave with pay for parents with sick infants, and so forth.

Family Resource Centers. One option for providing a range of preconceptional and prenatal primary prevention education and support services is through family resource centers. Family resource centers can be located at health care facilities, community-based organizations, or school and can provide assessment (depression, violence, drug and tobacco), education (parenting, child

care, pregnancy) and other support services. They can also be a source of child care, despite nutrition (WIC) and other support services. There are several examples of such centers in California, and each provides an important platform for organizing services into a coherent continuum for pregnant women.[2]

Barriers

Even when services exist, they may not be used effectively. There continue to be significant barriers to early and adequate use of prenatal care, particularly among those who can benefit most from it.

Low Valuation. The strongest and most consistent barrier to early and adequate prenatal care is the low valuation of prenatal care in the eyes of both expectant mothers and providers (IOM 1988. It is hypothesized that women who do not obtain prenatal care live complicated, highly stressful lives characterized by daily problems and struggles. It is perhaps not surprising that prenatal care is a low priority for such women. Low valuation of prenatal care, compounded by other barriers like transportation difficulties, inhospitable institutional practices (long waits, poor communication, inconvenient clinic hours, rude personnel, culturally incompetent surroundings, and complicated registration procedures), fear of doctors and medical procedures, ambivalence or denial about pregnancy, and lack of a partner or family support, lead to inadequate utilization.

For preconceptional care, low valuation may be the result of lack of knowledge. Many American women do not know about preconceptional care. In one survey, only one in three women age 18-45 reported taking daily multivitamins containing folic acid, and only one in five women under 25 reported doing so. About two-thirds of women have heard or read something about folic acid, but of those who knew about it, only 16% knew that folic acid helps prevent birth defects (CDC 1997).

Many providers are unaware of the benefits of preconceptional care and therefore fail to promote it. In a survey of primary care physicians in training, for example, only 57% of the respondents stated that they routinely address the rubella status of young women. Another survey found residents in family medicine and internal medicine to have limited knowledge of preconceptional care for diabetics. In a study of 47 women with pregestational diabetes, only 11% had evidence of adequate glucose control, and 73% had unplanned pregnancies, in spite of the fact that over 80% received medical care within six months of conception (Rodgers 1996).

Another reason for low valuation is the perception that preconceptional care is for women who are actively trying to get pregnant. Targeting preconceptional care to only those women who are actively attempting pregnancy excludes women who experience unintended pregnancy. A routine visit by any woman to her primary care or family planning provider should be seen by that

2 A forthcoming report in this series (Shannon M, B Waddell & R Durr, *Using Family Resource Centers to Support Young Children and Their Families*) will provide an in-depth look at family resource centers in California and around the nation.

provider as an opportunity to provide preconceptional care. These findings also highlight the need for and potential targets of evaluation and training efforts.

Cultural Competency. The State of California is notable for its ethnic and cultural diversity. Hispanic Americans, Asian Pacific Islander Americans, and African Americans make up about half of the state population. Nearly half of the half million live births in California in 1997 were born to Hispanic women, and 45% of all births were born to women who were born outside the United States.

But the diversity we celebrate also brings challenges to the delivery of preconceptional and prenatal care. Within the Medi-Cal managed care, there are mandates to provide culturally and linguistically competent services to the beneficiaries of care. However, there is little monitoring to ensure cultural competency in preconceptional and prenatal care.

Service Coordination. Another barrier frequently identified by providers and clients alike is the inadequate coordination of various prenatal services among different providers. Examples include weak links between prenatal services and pregnancy testing sites, and poor service coordination between prenatal care providers and WIC program. After a positive pregnancy test at the family planning clinic, a woman may have to wait weeks before she can get her first prenatal care visit. Difficulty in coordinating care is also due to the inability of providers to share data because of confidentiality issues.

Similarly, after a pregnant woman has been identified as being abused or a substance user, there is little help available to the clinician in coordinating the various services that she needs. A key barrier to providing comprehensive prenatal care for these women is not simply a problem of service capacity; it is also a problem of service coordination. Given the importance of coordinating services, the next section will address its problems greater detail.

VI. Systems Fragmentation and Missed Opportunities

The problems with service coordination are symptomatic of a larger problem in reproductive health care — the fragmentation of service delivery. This fragmentation occurs at three levels:

- Between family planning and other reproductive health services.
- Between reproductive and non-reproductive health services.
- Between reproductive health care and children's health care.

Family planning exemplifies such fragmentation. Family planning has traditionally been a "carved-out" program. It is one of the few remaining categorical programs not folded into the Title V MCH block grant, and family planning services are disjoined from other maternal and child health services that serve the same population.

Another example of the systems fragmentation is the separation between reproductive health care and non-reproductive health care. Many low-income women can access health care for reproductive purposes, but not for non-reproductive purposes. Screening for cervical cancer and sexually transmitted infections is not funded for reproductive-age women who do not qualify for either family planning and/or prenatal care services. There is little access to the health system prior to pregnancy for many women to serve as a vehicle for preconceptional care. Most low-income women lose their Medi-Cal coverage 60 days after delivery, thereby offering little hope of providing an interconceptional care visit.

Given that providers of reproductive health care are not working together themselves, it is perhaps not surprising that they are not working with providers of children's health care. Despite wide recognition of the impact of prenatal and preconceptional care on children's health, there is often a disconnect between those who provide care for the mother and those who provide care for the child. It is as if what happens before birth has nothing to do with what happens afterward. Obstetricians often see their work ending with birth, and pediatricians see their work beginning with birth. An example of this disconnect is breastfeeding. Many obstetricians see it as the pediatricians' job to promote breastfeeding, while many pediatricians see it as the obstetricians' job. As a result, neither does well in promoting breastfeeding.

This fragmentation of reproductive health care in the health care sector has raised several concerns. First, fragmentation generates inefficiency. Three pap smear tests may be performed on the same woman visiting the STD, family planning and prenatal care clinics on the same day. Neither the patient nor the provider may know what has or has not been done in another clinic.

Second, fragmentation generates barriers. The lack of coordination among the various prenatal services, as discussed above, may present a barrier to early and adequate use of prenatal care. Even pregnant women with "pregnancy-only Medi-Cal" cannot receive totally reimbursed care for their health problems. For instance, if one of these women has a pregnancy complicated by an underlying disease process (such as systemic lupus erythematosus), her specialized care and hospitalization for this condition will not be reimbursed by Medi-Cal.

Most important of all, as discussed earlier, fragmentation generates missed opportunities. There are many ways through which preconceptional and prenatal care can help promote early childhood development; today these remain missed opportunities because providers of reproductive health care and children's health care are not working together. Preconceptional and prenatal care can connect these disconnected but inherently related fields by serving as the point of entry, the platform, the partner, and the provider of services related to early childhood development as envisioned in Proposition 10.

Reframing Prenatal and Preconcepional Care

Point of Entry. Prenatal and preconceptional care can be the point of entry for many services related to early childhood development. For low-income households in particular, pregnancy is often the only time that a woman and her family come in contact with the health care system.

Examples of how prenatal care may serve as a point of entry for services related to early childhood development include:

- Screening and promotion of childhood immunization by prenatal care and preconceptional/ interconceptional care providers.
- Screening and referral of pregnant or postpartum women with substance abuse or mental health problems.
- Referral to a family resource center and other more complex service provider.

Platform. Most women in California get prenatal care at some point during pregnancy. Prenatal care, therefore, may serve as an administrative platform for many key Proposition 10 activities, such as:

- Parental education and support may be funded or administered through pregnancy-related Medi-Cal or CPSP, and at select sites a more comprehensive set of services can be added to existing services.
- Domestic violence and child-abuse prevention programs may be funded or administered through Title V or Title X and provided as part of the prenatal service delivery package.

Partner. After the baby is delivered, the job of the obstetrician, the midwife, or other types of prenatal care providers is not done. Because of the unique relationship that the obstetrician and other types of prenatal care providers have with the woman and the family, he or she can partner with the pediatrician in promoting early childhood development. Examples include:

- Counseling for cessation of cigarette smoking jointly by the obstetrician and the pediatrician.
- Provision of parenting education and support jointly by the midwife and the pediatric public health nurse.

Provider. In some circumstances, prenatal care providers can directly affect early childhood development. Examples include:

- Support of breastfeeding by the obstetrician.
- Identification and referral of the mother with postpartum and persistent depression or other mental health problems.
- Promotion and counseling on good nutrition by the midwife or the health educator.

These opportunities to enhance early childhood development by prenatal care providers are largely missed today because of systems fragmentation. It is our hope that Proposition 10 will provide the "glue" for a more integrated, more seamless system that will better serve women and children in California.

VII. Recommendations

We hope that we have made our case that prenatal care is an essential building block for early childhood development. We have described the population needs and the service system capacity, and have identified the gaps, barriers, and missed opportunities in service delivery. How can Proposition 10 commissions help?

For those of us who want a healthy start for all children in California, Proposition 10 presents an incredible opportunity to close service gaps, remove barriers, and leverage additional resources to enhance service capacity and service coordination in perinatal care. We recognize that Proposition 10 cannot do everything for everybody; we have therefore identified a few priority areas where small investments in prenatal care can yield big dividends in early childhood development. In this section, we will make recommendations on how the commissions can have the greatest impact on reproductive health and early childhood development with Proposition 10 monies. Where appropriate, we will indicate whether such investments should be made by the State Proposition 10 Commission, or be best left up to each individual county commission for their implementation.

1. Promote Outreach

Despite the progress made in the past decade in improving access to prenatal care, one in five women in California starts prenatal care after the first trimester; African Americans, Hispanic Americans, and Native Americans are more likely to start prenatal care late. The vast majority of women do not get preconceptional care.

How do we encourage pregnant women to utilize prenatal care early, especially those who need it the most? How do we encourage women to use preconceptional care, whether or not they are planning on getting pregnant? Peer education, family (sisters, parents, grandparents) involvement, media and social influence, the use of incentives, case finding, care coordination (case management), and psychosocial support are all ideas that have been tried with some success. Several examples of programs that seem to work are the following:

- Evaluation of the Comprehensive Perinatal Outreach Program (CPOP) in 1994 showed that between November 1993 and August 1994, the four participating Los Angeles County interdisciplinary teams and 22 community-based organizations (CBOs) reached over 144,400 members of the community, male and female, with over 5,300 outreach events. Of these community members, 1,265 were unmarried, pregnant Latinas in their early twenties with less than a high school education. Eighteen percent of all pregnant women contacted by outreach teams had no prior prenatal provider; nearly 30% had no prior health insurance. CPOP teams and CBOs enrolled 2,453 high-risk pregnant women into case management services; these women were also predominantly Latina, unmarried, unemployed and undereducated. Despite the fact that women case-managed by CPOP averaged 3.9 risk factors per pregnancy (summing medical, psychosocial and nutritional risks), babies born to CPOP case-managed women did quite well, with an average birthweight of 3,280 grams. Only 7.5% of CPOP case-managed deliveries were of low-birthweight infants; 6.4% of all Los Angeles County

infants in 1994 had low-birthweight births. Despite the high-risk nature of their pregnancies, African-American women case-managed by CPOP delivered a smaller percentage of low-birthweight infants than did African-American women in the county as a whole: 10.8% versus 13.0% (Fink 1994).

- The Maternal Outreach Management System (MOMS) in Orange County provides another example of a culturally competent outreach program. MOMS has also implemented a community-based model with more than 6,000 women participants since 1993. Results have shown improvement in birth outcomes and improved access to care. The program focuses on cultural, social and language sensitivity and is neighborhood-based and family-centered.

- The Healthy Start Program was started in 1990 to assist communities in developing innovative, multidimensional community approaches to reducing infant mortality. The projects developed their own interventions, and nine models of interventions evolved (Healthy Start National Resource Center 1999). For example, three projects developed family resource centers with an array of services available at one community site. Services included high school graduate equivalency degree (GED) classes, food vouchers through the food stamps and WIC programs, cash assistance through the welfare program, on-site Medicaid links, health education and life planning. Results of the national evaluation of the Healthy Start program are to be released shortly.

We believe that such outreach efforts are best developed and implemented at the local level rather than at the state level. Each county Proposition 10 Commission must consider the unique reproductive health needs of the population in the county, as well as the service system capacity and community assets. Outreach strategies necessarily differ between urban and rural counties, and between counties with different ethnic/cultural make-up. County Proposition 10 commissions can also partner with local private foundations, and Title V and Title X programs and agencies to fund demonstration projects to increase participation in preconceptional and prenatal care.

2. Enhance Service Capacity

Once pregnant women avail themselves of services, we should have the capacity to serve their needs. Although Medi-Cal expansion and enhanced reimbursement have significantly expanded the capacity of the system to provide essential prenatal services, many supportive services are still lacking. We have identified three priority areas in which Proposition 10 commissions can make strategic investments.

- Parenting Education

Enhancing parental education and support is a central goal of Proposition 10, and we feel that such education and support should start before the baby is born. As discussed earlier, there is a dearth of parenting classes for expecting parents or families with infants and toddlers. We recommend that local commissions use some of the Proposition 10 monies to develop and sustain these classes, perhaps in partnership with other local Title V agencies and programs. In addition

to parenting classes, Proposition 10 should support the development of policies and programs that provide psychosocial and social services support that make it easier for parents to be good parents (e.g., child care, flexible work hours, extended paid parental leave for sick or premature infants).

- Smoking Cessation

A logical area for strategic investment is smoking cessation. Proposition 10 monies are generated from a surtax levied on cigarette smokers, and it is only fair that a portion be spent on smokers. We recommend that each county Proposition 10 Commission consider allocating a portion of its Proposition 10 monies to expanding local efforts on prenatal smoking cessation. Such efforts should include not only smoking cessation programs, but social services and psychosocial support to reduce the antecedents of smoking (e.g., programs to reduce causes of stress during pregnancy). Such efforts necessarily differ by communities and are therefore best promoted at the county level rather than the state level. We further recommend that such efforts target high-risk populations in the county (e.g., African Americans, adolescents). The State Proposition 10 Commission can assist county commissions in developing strategies to leverage additional sources of support for prenatal smoking cessation, such as Temporary Aid to Needy Families (TANF) funding that is set aside for tobacco, alcohol and other drug treatment programs.

We cannot make a recommendation for enhancing preconceptional and prenatal smoking cessation programs without making a similar recommendation for strengthening the service systems capacity for alcohol and other substance-use treatment programs. Behavioral modification programs such as Alcoholics Anonymous may be adapted for expectant families. It has been documented that most drug treatment programs failed to effectively include women by not offering services women specifically need, such as prenatal care (Beschner 1981), and the "need for drug treatment services for pregnant women and mothers far outweighs their availability" (Chavkin 1991).[3]

- Domestic Violence Prevention

We have pointed out the inadequate number of shelter beds for pregnant women who are victims of domestic violence. Other supportive services, such as social work, are often unavailable; even if they are available, they are often underfunded, and face constant threats of de-funding at a time when most hospitals are facing increasing economic pressures. The lack of service system capacity to support screening is the greatest deterrent to universal screening of all pregnant women for domestic violence.

If Proposition 10 Commissions want to put an end to domestic violence against pregnant women, they must leverage their investment in building the service capacity for domestic violence

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3 See another report in this series, Gardner S and N Young, *Alcohol, Tobacco, and Other Drugs in the Lives of Young Children*, in N Halfon, E Shulman, M Shannon and M Hochstein, eds., Building Community Systems for Young Children, UCLA Center for Healthier Children, Families and Communities, 2000, for a discussion of drug and alcohol treatment programs that serve pregnant women and families with young children.

prevention and treatment by existing shelters for battered women, and for care coordination/case management by social workers, public health nurses, or some "ombudsperson." Additional support is also needed for primary prevention programs of family violence, such as individual and group counseling for men and male adolescents.

3. Provide Psychosocial Support at Different Levels

As we pointed out earlier, it may not be enough to provide parenting or smoking cessation classes without addressing the psychosocial factors that make it difficult for expectant or new parents to stop smoking or be good parents. A better balance is needed between the current clinical approach to preconceptional and prenatal care, and intervention efforts that address social and behavioral determinants of perinatal health. Such efforts might include development of family resource centers to provide psychosocial support, including child care, to expectant or new parents. Such efforts might also include policy changes to allow greater flexibility in work hours and responsibilities for pregnant women, or longer paid paternity leave for fathers with infants, particularly sick or low-birthweight babies. State and county Proposition 10 commissions are encouraged to think outside the box; preconceptional and prenatal care refer not only to the medical care the doctors provide to the pregnant woman in the clinic, but also the care that the family, the community, and the society at large provide to the parents to promote the healthiest start for the baby and the family.

4. Enhance Service Coordination and Systems Integration

As we pointed out, even if the services exist, they may not be used because of a lack of service coordination. Domestic violence prevention serves as a good illustration, where providing resources needed for service coordination is essential.

We also pointed out how systems fragmentation has led to important missed opportunities for reproductive health care to influence early childhood development. Short of an overhaul of the system, here we recommend a few simple strategies by which local Proposition 10 commissions can help integrate systems of care within reproductive health, as well as between reproductive health and children's health systems:

- Cross-train the workforce. Proposition 10 monies can be used to support local efforts to cross- train the reproductive health and children's health care workforce. For example, prenatal care providers can be trained to discuss parenting, family planning providers can be trained to screen for childhood immunization, and well-baby care providers can be trained to promote preconceptional care. Title V or Title X funds can also be leveraged for these efforts.

- Enhance service coordination. This can be accomplished by providing a mechanism for interagency coordination and collaboration in reproductive health, similar to the Children's Planning Council in each Service Planning Area in Los Angeles County. This Reproductive Health Council would include not only family planning and prenatal care providers, but also

HIV and STD clinic providers, school-based clinic providers, battered women's shelter providers, and so forth. The Reproductive Health Council will coordinate with the Children's Planning Council in the planning, implementation, and evaluation of Proposition 10-sponsored programs and activities.

- Experiment with service integration. Categorical funding restricts the ability for experimentation with service integration. Proposition 10 can provide seed monies to fund pilot projects that offer integrated reproductive health services. One such idea is a mother-toddler clinic, where obstetricians and pediatricians work side by side to provide integrated care for both women and infants.

5. Fund evaluation and research

Once we have the programs in place, how do we know that they are working? Most intervention programs in perinatal health suffer from a lack of rigorous program evaluation. Many such programs operate on shoestring budgets that cannot afford formal evaluation. Other programs sustain continued funding by coming up with numbers that look good. As a result, it is difficult to find best practices that have proven their worth. How do we know that a program is making a difference? How do we know that a program is cost-effective? How do we know that Proposition 10 monies would not be better spent on another program? We propose that no program should be funded by a Proposition 10 Commission without a plan for program evaluation, and that 10 to 20% of program budget be set aside for evaluation.

Most programs lack the internal expertise to conduct data analysis and program evaluation. And it is too expensive for many programs to hire an outside consultant for that purpose. County departments also lack the funding and expertise to perform research and evaluation. This is where academia can help. For example, many schools of public health offer expertise in program design, implementation, evaluation, and quantitative methods. Proposition 10 monies can be used to engineer a partnership between academia and public health agencies. In addition, Proposition 10 monies can be used to leverage additional funding from federal sources (e.g., Maternal and Child Health Bureau) or private foundations (e.g., Sierra Health Foundation, California Wellness Foundation) that have funded research in reproductive health services.

6. Promote Cultural Competency

As discussed earlier, our diversity also presents challenges in service delivery and program planning. How do we get the word out about folic acid in all the different languages spoken in California? How do we promote breastfeeding to women from different cultures? How do we draw immigrant families to get their children immunized? These and other questions need to be addressed if we are to ensure that *all* children in California get a healthy start. We recommend support of local, grassroots efforts to promote cultural competency in perinatal and children's health care. We further recommend that local Proposition 10 commissions partner with community health care consortia to develop programs to promote cultural competency. Such

programs must involve community participation from the very start, and must be held accountable to the community.

There also needs to be better assurance of cultural competency in perinatal health care. Cross-cultural communication is part of the required training for CPSP providers, but what is the follow-through? Prenatal care providers who contract with Medi-Cal managed care are now required to provide CPSP without additional support. What is their capacity to provide prenatal education and psychosocial support in different languages? Are they providing easy-to-read and culturally appropriate pamphlets in the client's preferred language? Are they providing interpretation services when needed? There needs to be better performance monitoring of cultural competency in perinatal services.

7. Invest in Preconceptional Care

Lastly, we have identified preconceptional care as the top priority area for strategic investment. We see no issue of greater urgency, of greater need, and of greater potential for impact on perinatal health and early childhood development than preconceptional care.

This should also include interconceptional care for women who have had a poor pregnancy outcome. These women are at great risk for having another poor pregnancy outcome. For example, women who have had one preterm birth have a 15% chance of having another preterm birth. The recurrence risk for stillbirth and severe pre-eclampsia is 15% and 30%, respectively. Many such women are lost to follow-up 60 days following their delivery, when their Medi-Cal eligibility expires. They may not access the health care system until they get pregnant again, at which time it may be too late to prevent another poor pregnancy outcome.

The Proposition 10 commissions can play several key roles in promoting preconceptional and interconceptional care for all Californians. As discussed earlier, currently there is no public funding allocated to preconceptional care. Proposition 10 commissions at both the state and level should consider encouraging more extended coverage for preconceptional care.

We see California's Family PACT program[4] as the best potential partner for Proposition 10 in promoting preconceptional and interconceptional care. Strategically, Proposition 10 monies can be used to leverage additional federal support for Family PACT services. For every dollar invested in preconceptional care by Proposition 10 and the State Office of Family Planning, nine dollars will come from the federal government in matching funds. Although Family PACT does not cover preconceptional visits per se, it does cover many of the more costly elements of preconceptional care, such as pap smears, screening for hepatitis B and syphilis, and rubella screening and immunization. Proposition 10 monies can fund elements of preconceptional care not covered by Family PACT, such as preconceptional counseling, genetic screening, and screening for pre-gestational diabetes. We also see Family PACT as the best vehicle to deliver preconceptional care to low-income families. With 1,800 providers at 2,500 office sites in

4 Described briefly on page 20 of this report; for more information, see http://www.dhs.ca.gov/pcfh/ofp/FamPACT.

California, Family PACT provides a ready-made capacity for service delivery. In addition, it also provides an existing structure for administration.

Although Proposition 10 specifically prohibits the use of its monies for family planning, it does not prohibit its use for provision of preconceptional care. Nor does it prohibit specifically the use of Family PACT as a vehicle for delivering preconceptional care, as long as the monies do not get diverted to providing family planning services. We want to make clear that our recommendation would draw additional federal monies to support preconceptional care, without diverting Proposition 10 monies to provide family planning services.

Expansion of public education and outreach for preconceptional care is also needed because many physicians and most women remain unaware of the benefits of preconceptional care. A statewide public education campaign would address this gap. By partnering with Title V agencies or the March of Dimes, Proposition 10 commissions could promote public educational messages targeting particular high-risk populations, such as preconceptional screening for pregestational diabetes among Hispanic and Native Americans, or preconceptional smoking cessation among African Americans and adolescents.

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www.aafp.org: American Academy of Family Physicians. The official site for the National Association of Family Doctors, with information about clinical practices and research conducted by members.

www.aap.org: American Academy of Pediatrics. Committed to the attainment of optimal physical, mental, and social health/well-being for all infants, children, adolescents and young adults

www.abcbirth.com: The ABC's of Pregnancy. An online textbook about pregnancy, childbirth, and early parenting.

www.acog.org: The American College of Obstetricians and Gynecologists. Dedicated to women's health care issues.

www.amnionet.com: Amnio Net. Dedicated to understanding the transitions of fetal development as well as the health of the child and the mother before and after birth.

www.awhonn.org: Association of Women's Health, Obstetric and Neonatal Nurses. Designed to promote the health of women and newborns.

http://cerhr.niehs.nih.gov: Center for the Evaluation of Risks to Human Reproduction website. A resource for the latest information about potentially hazardous effects of chemicals on human reproduction and development.

www.desaction.org: DES Action US, a national, non-profit consumer organization dedicated to informing the public about DES (diethylstilbestrol) and helping DES-exposed individuals. Contains a quarterly newsletter, The DES Action Voice, and many publications on various aspects of DES exposure, as well as a link between DES-exposed people and researchers and the medical community.

www.geneticalliance.org: Genetic Alliance, an international coalition of individuals, professionals and genetic support organizations working together to enhance the lives of everyone impacted by genetic conditions.

http://hlunix.hl.state.ut.us: Utah Department of Health. Offers links to major public health services and programs in Utah.

www.lalecheleague.org: La Leche League International, an international, nonprofit, nonsectarian organization dedicated to providing education, information, support, and encouragement to women who want to breastfeed.

www.modimes.org (English) or www.nacersano.org (Spanish): The March of Dimes, an organization that seeks to address the four major problems that threaten the health of America's babies: birth defects, infant mortality, low birthweight, and lack of prenatal care.

www.motherisk.org: Motherisk, a program through the Toronto Hospital for Sick Children created in 1985 to provide evidence-based information and guidance concerning the potential risks to the developing fetus or infant, from exposure to drugs, chemicals, diseases, radiation and environmental agents.

www.preginst.com: The Pregnancy Institute, Inc., a non-profit organization created to study normal pregnancies and promote healthier pregnancies resulting in well-monitored, full-term live births.

www.sra.org: Society for Risk Analysis. Provides an open forum for all those who are interested in risk analysis, including risk assessment, risk characterization, risk communication, risk management, and policy relating to risk.

IX. Appendix

The following is a partial list of organizations and websites for perinatal programs in California. We suggest calling regional perinatal programs first to learn more about specific services and organizations in your area.

Region	Name	Telephone
Region 1	North Coast Perinatal Access System	(415) 476-3868
Region 2	Northeastern California Perinatal Outreach Program	(916) 733-1750
Region 3	Perinatal Network of Alameda/Contra Costa	(510) 652-5188
Region 4	Mid-Coastal California Perinatal Outreach Program	(650) 723-5763
Region 5	San Joaquin/Sierra Regional Perinatal Program	(209) 221-6315
Region 6	Perinatal Advisory Council of Los Angeles Communities	(818) 382-3956
Region 6.1	Perinatal Outreach Education Program	(562) 933-3292
Region 6.2	South Bay Perinatal Access Project	(310) 222-3651
Region 6.7	Community Perinatal Network	(323) 725-0199
Region 7	Inland Counties Regional Perinatal Program	(909) 824-4359
Region 8	Orange County Regional Perinatal Program	(714) 456-7882
Region 9	San Diego/Imperial Counties Regional Perinatal System	(619) 467-4990
Region 10	Kaiser Permanente Regional Perinatal System (North)	(510) 987-3430
Region 11	Kaiser Permanente Regional Perinatal System (South)	(626) 405-6052

Other Organizations

Climb (907) 746-6123
CSEC Inc. (508) 877-8266
For Teen Moms Only (815) 464-5465
Mothers United for Moral Support (MUMS) (414) 336-5333
National Organization for Rare Disorders (NORD) (800) 477-6673
National Parent to Parent Support and Information System, Inc. (NPPSIS) (800) 651-1151
Pen Parents, Inc. (702) 826-7332
Resolve Through Sharing (800) 362-9567
Support Organization for Trisomy 18, 13, and Related Disorders (800) 716-7638
Women's Legal Defense Fund (202) 986-2600

Useful Websites

The website for Perinatal Advisory Council of Los Angeles Communities (PAC/LAC) contains links to websites of many organizations providing preconceptional and prenatal services in California. See www.paclac.org.

X. Annotations and References to Tables 2 and 3

- Infant Mortality Rate = number of infant (up to 356 days of life) deaths per 1,000 live births
- Neonatal Mortality Rate = number of neonatal (up to 28 days of life) deaths per 1,000 live births
- Maternal Mortality Ratio = number of maternal deaths (direct and indirect, up to 42 days after termination of pregnancy) per 100,000 live births
- Low Birth Weight Rate = proportion of live births with the first newborn weight less than 2,500 grams
- Preterm Birth Rate = proportion of live births occurring at less than 37 weeks gestational age
- 1st Trimester Prenatal Care = proportion of live births in which prenatal care was initiated in the first trimester
- Smoking During Pregnancy = proportion of pregnant women who report using tobacco in the past month (national sample); proportion of pregnant women about to give birth who report current smoking at the time of admission to labor and delivery (California sample)
- Alcohol Use During Pregnancy = proportion of pregnant women who report any alcohol use in the past month (national sample); proportion of pregnant women about to give birth who tested positive for alcohol by enzymatic assay of urine on admission to labor and delivery (California sample)
- Substance Use During Pregnancy = proportion of pregnant women about to give birth who tested positive on urine toxicology screen on admission to labor and delivery
- Breastfeeding initiation = proportion of women who breastfed their infants immediately after birth and upon discharge from the hospital
- Abuse During Pregnancy = proportion of women who report physical abuse by an intimate partner during pregnancy
- Teen Birth Rate = number of live births per 1,000 teen women (in the age category)

1 National Center for Health Statistics. Births and Deaths: United States 1998. National Vital Statistics Reports, 1999;47(19).

2 Center for Health Statistics. Infant Death Rate for California. California Department of Health Services, 1999.

3 Center for Disease Control and Prevention: Maternal Mortality United States, 1982-1996. MMWR, 1998;47(34):705-707.

4 Maternal and Child Health Branch. Official Maternal Mortality Records. CA Department of Health Services. Epidemiology and Evaluation Section. Accessed 9/99.

5 National Household Survey on Drug Abuse. Cited in Office of Public Health and Science. Healthy People 2010 Objectives. U.S Department of Health and Human Services 2000.

6 Vega WA. Prevalence and magnitude of perinatal substance exposures in California. New Engl J Med 1993;329(12):850-854.

7 Ryan AS. The resurgence of breastfeeding in the United States. Pediatrics 1997;99(4).

8 Gazmararian JA, Lazorick S, Spitz Am et al. Prevalence of violence against pregnant women. JAMA 1996; 275(24):1915-1920.

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